

Naples, to be established in Northern Europe, it would be difficult to find a spot so admirably fitted as Lervik, on account of the richness of its fauna, and especially in view of the fact that the deep-sea fauna is brought almost to the door by the peculiar condition of the fjords, dredging up to 400 or 500 fathoms being attainable a few miles up the Hardanger.

E. RAY LANKESTER

Lervik, Stordoe, near Bergen, Norway, August 27

#### SCIENTIFIC RESULTS OF THE "JEANNETTE" EXPEDITION

THE last number (August 26) of *Der Naturforscher* contains a first attempt to lay down the scientific results of this expedition, in a paper by Herr H. Wichmann, based on the reports of Messrs. Melville and Danenhauer, and of the naturalist of the expedition, Mr. Newcomb. It is known that after having passed, on August 31, the wintering station of the *Vega*, the *Jeannette* sailed north, towards Wrangel's Land. But on September 5, when twenty miles north-east of Herald Island, she was frozen in, and during twenty-one months remained so, "the play of winds and currents." However drifted in different directions, she still advanced during all this time towards the north-west. The first wintering was north of Wrangel Land, which last proved to be a large island, and not a part of an Arctic continent as had been presumed. The precious observations on auroræ and magnetism which were made during the winter (about 2000 measurements) are unhappily lost, as well as extensive collections of birds and of deep-sea fauna. The depth of the ocean in these regions was everywhere very small—thirty fathoms on an average, with a maximum of sixty and a minimum of seventeen fathoms. The bottom was usually a blue ooze, with a few shells and sometimes stones, which seemed to be of meteoric origin.

The ship still drifted towards the north-west, and on May 17 a small island, called Jeannette Island, was sighted in  $76^{\circ} 47' 28''$  N. lat. and  $159^{\circ} 20' 45''$  E. long. It was a rocky hill, covered with snow, situated on the eastern flank of a high mountain. Two days later another island was discovered towards the west, and an expedition under Mr. Melville reached it, with many difficulties, and landed on it on June 3, 1881. It was called Henrietta Island, and is situated under  $77^{\circ} 8'$  N. lat. and  $157^{\circ} 43'$  E. long.; it is rocky, and 2500 to 3000 feet high; the rocks are covered with nests of birds, but the vegetation is very poor, consisting of lichens and mosses, and of one species of phanerogam; all the island was covered with a sheet of ice and snow 50 to 100 feet thick, and a mighty glacier reached the sea on the north coast. As is known, on June 13, under  $77^{\circ} 30'$  N. lat., and  $155^{\circ}$  E. long., the *Jeannette* was lost, the depth of the sea being there 38 fathoms. The crew, divided in three parties, went south, but ten days later they perceived that, owing to the drift of the ice, they had still advanced 27 miles north-west, being under  $77^{\circ} 42'$  N. lat. That was the highest latitude reached by the expedition. On July 9 they perceived land, and after a hard journey, reached it at a promontory they called Cape Emma ( $76^{\circ} 38'$  N. lat.,  $148^{\circ} 20'$  E. lat.). This island, which received the name of Bennett, is a high mass of basalt, covered with glaciers; the island was crossed by a party, after two days' travel, and the north coast proved to be more hospitable than the south; it has several valleys covered with grass, where reindeer bones and drift-wood were found; lignite was discovered on the south coast, and it is said that it would be quite useful for steamers. Dr. Ambler here collected fossils, as well as many amethysts and opals, but they were lost. The gulls were so numerous and so tame that hundreds of them were killed with sticks; the tides were regular, but very small, the level changing only two and three feet. The sea was free of ice in the west and south, and even

in the north-west a "water-sky" was seen, so that M. Danenhauer supposes that Bennett Island would be a good starting-place for future arctic expeditions. It was only on August 30 that the expedition discovered the first traces of men on the Faddeyeff Islands; and its further advance towards the delta of the Lena is well known. The scientific results of the *Jeannette* expedition cannot be yet completely appreciated, observes Herr Wichmann, but the note-books and surveys of its members having been preserved, as well as a good part of the collections, it is to be expected that they will contribute to a great extent to increase our knowledge of this part of the Arctic Ocean. The discovery of three new islands confirms the statements of Sannirikoff, who stated he saw land from the Faddeyeff Islands, and renders probable the existence of a whole archipelago in that part of the ocean. The exploration of the fauna and flora of the New Siberian Islands, which never was done before during the summer, promises interesting results. The problematical *polynias*, which stopped the advance of the sledge parties of Hedenström, Wrangel, and Anjou are not due to some warm currents, such having not been noticed during the temperature-observations of the *Jeannette*; they are simple openings in the ice, such as are observed elsewhere. Finally, the search expedition must give most important corrections to the maps of the Siberian coast between the Olenek and the Yana rivers, which has not been visited for sixty years; the observations of the American expedition will correct many of the observations of Lieut. Anjou. We may add to these expectations of Herr Wichmann that, as the Arctic law that "each polar expedition safely reaches the points which were sighted by the preceding one," will probably be true also for the North Siberian Seas, we must soon expect new and important discoveries in that direction, now that the way was opened to explorers of those parts of the Arctic seas.

#### NOTES

WE regret to learn that M. Joseph Liouville, the editor of the *Journal de Mathématiques*, died in Paris on September 7 at the age of seventy-six years. For some time back he had retired from his editorship and appointed M. Resal, a member of the Institute, as his successor. M. Liouville was born in St. Omer, admitted to the Polytechnic School in 1825, and appointed in 1829 an engineer of the Ponts-et-Chaussées. He soon resigned in order to devote himself entirely to the study of pure mathematics. He was elected in 1839 a member of the section of geometry in the Paris Academy. In 1848 he was sent by the electors of the Meurthe to the National Assembly, where he supported Arago's policy. In 1862 he was appointed a member of the Bureaux des Longitudes.

A MONUMENT to Becquerel, the French electrician, will be inaugurated this month at Chatillon.

DR. LEMSTRÖM, of Helsingfors, begins to-morrow a series of measurements of terrestrial currents, which measurements will be continued the 1st and 15th of each month. They will be made on two telegraphic lines, one of which, between Torneo and Helsingfors, runs north and south, and the other, between Mariehamn, on the Åland islands, and Kexholm, runs west and east.

THE Council of the Parkes Museum have just acquired new premises in Margaret Street, Cavendish Square, to which the museum is to be removed from University College as soon as the alterations and additions, which are now being made under the direction of Mr. Mark H. Judge, A.R.I.B.A., are completed. The new museum will consist of a central hall, suitable for meetings and lectures, a library and corridors, all lighted from the top and well suited for exhibition purposes. The meetings

and lectures on sanitary and other matters connected with the health of the people, which were only occasional while the museum was at University College, will form a permanent feature of the institution when it is reopened in Margaret Street. It is expected that the museum will be reopened before Christmas, in the meantime communications may be addressed to the Secretary and Curator, Mr. Mark H. Judge, at 8, Park Place Villas, Paddington, W.

IN the Report of the Executive Committee to the General Committee of the Great International Fisheries Exhibition at the meeting on the 7th inst., it was stated that since the date of the last meeting of the General Committee the arrangements for the preparation of the Gardens of the Royal Horticultural Society for the reception of the Exhibition have been greatly advanced. The plans of the proposed buildings have been determined upon, and the details of construction are so arranged as to be economical and effective, and can with ease be extended in the event of more space being required. The total amount of space at present provided for by the existing and new buildings, will amount to 220,300 square feet. A sub-committee has been appointed to superintend the construction of tanks and aquaria, and all the necessary arrangements for the piscicultural department. Since the date of the last meeting the Committee have received highly encouraging notices of adhesion from several additional governments and colonies, one of the latest received being a highly satisfactory telegram, through the Foreign Office, from the Imperial Government of China. From several parts of France also the process of oyster cultivation, carried to great perfection in that country, will be well represented; and the exhibits promised from Hungary, Italy, and Germany, are such as the Committee feel will be in the highest degree interesting, whilst from Norway and Sweden, the Netherlands, and other countries, including the Chilian Republic, which enjoy the advantage of local committees sanctioned by the governments, the collective exhibits sent will of course approach perfection. The International Meteorological Committee, who recently held their Annual Conference at Copenhagen, agreed to forward to the Exhibition from their respective countries representations of the system of forecasting the weather. From the colonies, for the most part, very satisfactory replies have been received, and official arrangements have been organised in nearly all the colonies connected in any way with the fishing interest. In the list of special prizes the Committee have made large and important additions, notably the prize of 600*l.* for the best life boat, and have received from private individuals donations to cover a certain amount of the expenditure thus involved. Among the more scientific subjects for prize essays are the following:—The Natural History of Commercial Sea Fishes of Great Britain and Ireland, with special reference to such parts of their natural history as bear upon their production and commercial use. This would include natural history, food, habits, and localities fish frequent at different seasons, and artificial propagation—100*l.* (This will not include Salmonidæ). On Improved Facilities for the Capture, Economic Transmission and Distribution of Sea Fishes, 100*l.* On Improved Fishery Harbour Accommodation for Great Britain and Ireland, indicating the localities most in need of such Harbours, the general principles on which they should be constructed, and the Policy the State should adopt in aiding and encouraging Harbour Accommodation for fishing purposes, 100*l.* The best Appliances and Methods of Breaking the Force of the Sea at the Entrance to Harbours and elsewhere, 100*l.* On the Food of Fishes both in Fresh and Salt Water, accompanied by illustrations and Preparations, 50*l.* On the Introduction and Acclimatisation of Foreign Fish, 25*l.* On the Propagation of Fresh-water Fish, excluding Salmonidæ, 25*l.* On the Propagation of the Salmonidæ, 25*l.* On Salmon Disease: its Cause and Pre-

vention, 25*l.* On Oyster Culture, 25*l.* On the best Method which has been practically tested of cultivating Crustacea, 25*l.*

THANKS mainly to the exertions of Baron Mielchko Maclay, the Biological Station at Sydney has now been completed. It consists of a six-roomed cottage erected on the jutting point of land between Watson's Bay and Camp Cove. The building is of wood on a stone foundation with an iron roof. In the stone basement part of the space has been walled in, and when more funds are available other portions will be partitioned off as rooms for the carrying on of rough dissections and other operations which cannot well be carried on in the rooms above, and for the storage of bottles, spirits of wine, chemicals, dredges, nets, and other collecting gear. The rooms above are six in number, in three suites of two rooms each, so that biologists wishing to live close to their work may use one room as a bed-room, and the other as a laboratory. The laboratories are 15 feet by 12, with a lofty ceiling; the windows are large, with an easterly aspect, and large skylights permit of the entry of a certain amount of additional light from above. The partitions between the rooms are double—the interspace being filled with sawdust to deaden noises. A verandah 6 feet in depth runs round the whole building. Considerable additions require to be made to the appliances of the institution before it can be regarded as efficiently equipped for the purposes for which it is intended. Aquaria and other appliances are still wanting; and it is very desirable that a house should be erected for the accommodation of a paid caretaker, who should attend to the aquaria, dredge for specimens, and in other ways assist the biologists working in the stations. The Royal Society of New South Wales has granted the Biological Station the sum of 25*l.* from its funds, and it is expected that this grant will be repeated from year to year. The Royal Society of Victoria have also promised an annual sum, and the Australian Biological Association will also probably be in a position to grant an annual sum to the Sydney Station. Further subscriptions, however, are still required, and will be thankfully received by the treasurer. The station is open to biologists of the male sex, irrespective of nationality, on payment of a small weekly sum to meet the expenses of service, &c.

WE find some notes on the recent meeting of the American Association at Montreal, in the *New York Nation*. This year the well-known geologist, Principal Dawson, was the presiding officer. The attendance was large, especially from the United States. Among the men of note from across the ocean the most conspicuous are Dr. W. B. Carpenter, and the Rev. Dr. Haughton, of Trinity College, Dublin. Besides these may be mentioned Dr. Valdemar Kowalewski, Professor of Geology in Moscow, Dr. König, of Paris, the investigator in sound, and Mr. Fitzgerald of Dublin. The most liberal hospitalities of a prosperous city were extended to the guests from a distance. The retiring president, Prof. Brush, of New Haven, selected for his address a theme in his own department, and treated it like a master. His discourse was a good illustration of the tendency of scientific men to limit their work to a special line, and to avoid general observations upon the fields which they have not personally tilled. According to the *Nation*, there was nobody in the Congress, and not more than one person in all the land, so competent as he to review the history of American mineralogy, and to point out the requisites for the further prosecution of the science. A marked feature of American minerals, said Mr. Brush, is the grand scale upon which crystallisation has taken place—common mica in sheets a yard across, feldspar where a single cleavage plane measured ten feet, prisms of beryl four feet long—and so in general much larger crystals than those obtained from European localities. Another noteworthy fact is the occurrence, in abundance, of some of the rarer

elements as constituents of the minerals found. For example, among the rare earths, glucina, zirconia, &c., lithium occurs in our lithia micas, and spodumene containing from 5 to 8 per cent. of lithia, occurs by the ton in at least one locality. Among rare metals which form metallic acids, columbium, the first metal new to science discovered in America, is found from Maine to Georgia. Many other examples were given, including the rare metal tellurium, which is found in Colorado in one locality, where masses of twenty-five pounds have been taken out. Yet only a small portion of the United States has been thoroughly explored, and we are far behind Europe in the variety of minerals obtained from our mines. If trained mineralogists would oftener go into the field, and if wealthy amateurs would aid in exploring American localities as freely as they engage in importing costly specimens from Europe, they would do much to foster science. In the afternoon of Wednesday the introductory addresses were given by heads of the nine sections into which of late the Association has been divided. The address in the Mathematical and Astronomical Section was read for its author, Prof. Harkness, of the Naval Observatory, on the Transits of Venus. It was an historical and, to a moderate extent, a critical review of what has been hitherto done in the observations of such transits, with particular reference to the results attained in 1874 and to those which are to be expected in 1882. Dr. H. C. Bolton, of Trinity College, gave a review of the recent work of the Chemical Section, and then took for his theme the history of chemical literature, especially in its early aspects. In physics the speaker was Prof. Mendenhall, of Columbus, O., who was formerly in Japan, and he made an address on the methods to be pursued in teaching physics in colleges. Prof. W. P. Trowbridge, of Columbia College, in the Section of Mechanics, made a strong plea for the promotion of experiments in mechanics, in close connection with theoretical studies. He dwelt upon the extraordinary demands now made by the public on engineers, and gave many illustrations of what experiment has done, and instances of what it may do in the future, to determine problems of profound importance. In the Biological Section, Dr. W. H. Dall, of Washington, gave an account of what has been accomplished in this country towards a knowledge of the biology of the molluscs. In the related Section of Histology and Microscopy Prof. Tuttle, of Columbus, O., questioned the propriety of a special microscopical section, and in the section last to be named, the Anthropological, a paper by Dr. Daniel Wilson, of Montreal, was read on some of the physical characteristics of certain native tribes in Canada. In the Physical Section the most remarkable paper was that of Prof. Rowland, describing the new gratings which he has made at the Johns Hopkins University for the study of the solar spectrum. He exhibited the results obtained by these gratings in photographs of the spectrum, which, it is stated, far surpass any that have hitherto been made. The generous and informal hospitality of Montreal received grateful recognition on all sides. Excursions had been arranged to Ottawa and Quebec, private houses were freely opened to guests; the Local Committee on one evening, Principal Dawson on another, and the Art Association on a third, offered evening entertainments. Public lectures were promised by Dr. Carpenter on Deep-Sea Soundings, and by Prof. A. Melville Bell on Visible Speech. The number of persons enrolled as in attendance was more than eight hundred.

IT is stated that the curiosities and other articles brought home in the screw survey ship *Alert*, Capt. Maclear, now lying at Sheerness, have been securely packed, and are to be forwarded to the Hydrographer's Department at the Admiralty, where they will be examined, and then probably distributed among the National Museums.

ON Saturday, September 9, the Members of the Essex Naturalists' Field Club had a field-meeting at Grays, for the

second time this season, for the purpose of visiting the "dene-holes" in Hangman's Wood. As on the former occasion in June, arrangements had been made by Messrs. Brooks, Shoo-bred, and Co., of the Grays Chalk Quarries Company for the descent of the party into some of the holes, of which a very perfect one having six vaulted chambers was discovered, and was surveyed by Mr. T. V. Holmes, F.G.S. An ordinary meeting of the Club was held at the hotel in the evening, and some discussion as to the origin and age of these interesting prehistoric excavations took place. Mr. Henry Walker, Mr. Worthington Smith, and others, took part in the discussion, the president, Mr. R. Meldola, in conclusion, expressing his belief that much work would have to be done before the question could be in any way settled, and he suggested that the investigation should be taken up systematically by the Club.

THE Third Annual Cryptogamic Meeting of the Essex Field Club will be held on Saturday, September 23, in the Northern Section of Epping Forest, the head-quarters for the day being the "Crown Hotel," Loughton. At the evening meeting papers on cryptogamic botany will be read, and an exhibition of specimens will be held. Botanists wishing to attend should communicate with the Hon. Secretaries, Buckhurst Hill, Essex. This Club is rapidly developing into one of the most important local societies in the kingdom; its *Transactions*, of which part 6 is before us, have already attained formidable dimensions, and their contents are of solid value. In the new number we have papers on the "Origin and Distribution of British Flora," by Prof. Bolger; "On the Land and Fresh-water Mollusca of Colchester District," by Mr. H. Laver; "The Galls of Essex," by Mr. E. A. Fitch; "The Mammalia of Essex," by Mr. H. Laver; A List of the Hymenomycetal Fungi of Epping Forest, by Dr. M. C. Cooke; besides the address by the president, Mr. Meldola, Journal of Proceedings, field meetings, &c.

WE have before us the *Proceedings* of several other local Societies; in that of the Bristol Naturalists' we find papers on "The Age of the Wye," by Mr. C. Richardson; the Lepidoptera of the Bristol District, part v., by Mr. A. E. Hudd; the Fungi of the same district, by Mr. C. Bucknell, besides several papers on more general subjects. We are glad to meet with the *Transactions* of the Eastbourne Natural History Society in a more attractive and handy form than formerly; the number before us, for May, contains one or two papers on local subjects, though most of them are of a very general nature. The *Report and Transactions* of the Birmingham Natural History and Microscopical Society contains several good papers of a general character.

IN October Messrs. Longman and Co. will publish a Dictionary of Medicine, edited by Richard Quain, M.D., F.R.S. The editor has been engaged on this work for several years. He has, we are informed, received the assistance of a large number of the most eminent members of the medical profession, and others, who have contributed articles on subjects to which they have paid special attention. The work, it is stated, will furnish a complete record of the present state of medical science. It will be issued in one large volume containing nearly 1900 pp. medium octavo.

INTELLIGENCE received from the Austrian circumpolar observing party states that the *Pola* cast anchor in Marimus Bay, Jan Mayen, on July 13. In addition to the buildings brought in the ship, two more were erected from drift-wood, which was found in large quantities. There was little snow on the island, but much ice outside. The meteorological observations commenced on August 15 on the Beeren Mountain, at a height of 5000 feet. Two tablets stating the whereabouts of the expedition had been erected, one at Ekö, and the other in English Bay. The *Pola* left Jan Mayen on August 16.

SEVERAL shocks of earthquake have been felt at Panama recently ; one on September 7 caused a great deal of damage, while on the 9th another shock seems to have done still more damage. Several towns in the interior seem also to have suffered, whilst the long-dormant volcanoes of Chiriqui are said to be active again.

THE example of the English Government has produced some effect on the French military aéronauts. Their captive balloons will be exhibited publicly for the first time in the great manœuvres of this year.

THE Academy of Aérostation will try on September 22 the system of aerial, panoramic photography, for which they have received a subvention from the City of Paris. This scientific experiment, which, it is expected, will bear interesting results, will take place on the occasion of the *fête* of the "Defence National," round the Lion of Belfort, at a very little distance from the Observatory.

IN the *Transactions* of the New Zealand Institute, vol. xv. (for 1881, published in 1882), Mr. W. M. Maskell, F.R.M.S., continues his valuable memoir on the *Coccidae* of New Zealand, and describes interesting new forms. The descriptions appear to be clear, and the notes on economy full and serviceable. The figures are unfortunately rough, and in two instances where the males are delineated, are practically useless from this cause. This is unfortunate, because male *Cocci* are comparatively rare, and very much depends upon their careful delineation when discovered. We think no one would ever suspect the true position of the insect figured on Pl. xiv. Fig. 27, were it not for the surroundings.

WE have before us the *Sitzungsberichte und Abhandlungen der naturwissenschaftlichen Gesellschaft Isis in Dresden* for January-June, 1882. The publications of this old-established society seem to be scarcely so well-known in this country as they should be. The financial condition appears to be flourishing. There are few local societies in Germany that possess an invested capital of 250*l.* to 300*l.* We note, especially, the following papers contained in this part :—The Diamonds of the Royal Mineralogical Museum of Dresden, "crystallographische Untersucht," by A. Purgold ; Results of observations at the meteorological station at Dresden, by Prof. S. A. Neubert ; a paper on a fossil Pseudo-scorpion from the Carboniferous of Zwickau, by H. B. Geinitz ; and another on fossil Cockroaches from the "Dyas" of Weissig, by Dr. Deichmüller, illustrated by a plate. There are also several botanical papers.

THE Swedish Government has decided, that from the beginning of next year no individual shall be employed on railways or on board ship in that country till his sight has previously been tested as to colour-blindness, by a method devised by Prof. Holmgren of Upsala.

WE have received a letter from a gentleman in Hong-kong, signing himself "Verax," referring to a note in our issue of June 1, on the subject of the projected Chinese telegraph line between Hong-kong and Canton, and the alleged refusal of the Colonial authorities to permit the landing of the cable across Victoria harbour on British territory. The facts as stated in our note he allows to be correct. But whatever the grounds—and "Verax" fails to show there are any substantial ones—for local opposition to the enterprise, we regard it as peculiarly unfortunate that any forward step of the Chinese should be retarded by the British authorities.

A MEMBER of the Russian Geographical Society, Mr. Poliakov, who with a few followers has been exploring the island of Saghalien, recently ceded by Japan to Russia, has just returned

to St. Petersburg, having spent about a year in the island. He states that the greatest river, the Tymy, is navigable for vessels with sixteen feet draught for a distance of eight miles. This river is the only harbour on the island with the exception of Ruegda Bay on the north coast, but which is situated in a barren and unpopulated district. The flora and fauna were found to be the same as those of North Siberia. Judging from the antiquities and stone implements discovered, it is supposed that the island has been inhabited in prehistoric times, while other remains show that at one time large fisheries have been carried on here.

WE have on our table the following publications :—Ueber den Bau und das Wachthums der Zellhäute, Dr. Ed. Strassburger (Fischer, Jena) ; Synthèse des Minéraux et des Roches, F. Fouque et Michel Levy (G. Masson) ; Elementary Bo'any, Henry Edmonds (Longman and Co.) ; Handbuch der Vergleichenden Anatomie, E. O. Schmidt (Fischer, Jena) ; Our Great Peril if war overtake us with our Fleet deficient in Number, Structure, and Armament, Admiral T. M. C. Symons, G.C.B. (W. Kent and Co.) ; The Economics of Fair Trade, W. R. Herkless (Wilson and McCormick) ; The Physiology and Pathology of the Blood, R. Norris, M.D. (Smith, Elder, and Co.) ; On Failure of Brain Power, Julius Althaus, M.D. (Longman and Co.) ; Benderloch : or Notes from the West Highlands, W. Anderson Smith (A. Gardner) ; Silurfossiler og Pressede Konglomerater I Bergensskifene, Hans W. Reusch (Broggers, Kristiania) ; Meteorological Charts for the Ocean District adjacent to the Cape of Good Hope, Stationery Office ; also Remarks explanatory of the foregoing ; Catechism of Modern Elementary Chemistry, E. W. v. Volckxson (Kegan Paul) ; Cameos from the Silverland, vol. ii., E. W. White (Van Voorst) ; Worms and Crustacea, Alpheus Hyatt (Green, Heath, and Co.) ; Micro-Fungi, Thomas Brittain (Heywood) ; Faith, the Life Root of Science, Philosophy, Ethics, and Religion, H. Griffith (Elliot Stock) ; Experimental Physiology, Richard Owen (Longmans) ; The Origin and Relations of the Carbon Minerals, Prof. Newberry ; Tests of Incandescent Lamps for Fall of Resistance, &c., A. Jamie-on ; House Sanitation, G. H. Stanger, C.E. (C. John Steen, Wolverhampton) ; Induction, Willoughby Smith (Hayman Bros.) ; Hothouse Education, J. A. Digby (Stanford) ; Familiar Lessons on Food and Nutrition, Part I., T. Twining (Bogue) ; An Impromptu Ascent of Mont Blanc, W. H. Le Mesurier (Elliot Stock).

THE additions to the Zoological Society's Gardens during the past week include a Pig-tailed Monkey (*Macacus nemestrinus* ♂) from Java, presented by Mr. W. Mason ; a Rhesus Monkey (*Macacus erythreus* ♀) from India, presented by Mrs. H. C. Dawson ; a Crested Porcupine (*Hystrix cristata*), a — Spider (*Mygale*, sp. inc.), a Scorpion (*Scorpio*, sp. inc.) from West Africa, presented by Mr. G. H. Garrett ; six Spanish Blue Magpies (*Cyanoporus cooki*), three Pleurodele Newts (*Pleurodeles walti*) from Spain, presented by Lord Lilford, F.Z.S. ; a Greater Vasa Parakeet (*Coracopsis vasa*) from Madagascar, presented by Major-General Hill ; two Common Barn Owls (*Strix flammea*), British, presented by Dr. Boyd, F.Z.S. ; a Grey Ichneumon (*Herpestes griseus*) from India, presented by Mrs. Freeman ; six Sand Lizards (*Lacerta agilis*), European, presented by Herr J. Sehliger ; two Pennsylvanian Mud Terrapins (*Cinosternon pennsylvanicum*), two Adorned Terrapins (*Clemmys ornata*) from North America, presented by Mr. A. Forrer ; a Ring-tailed Coati (*Nasua rufa*) from South America, deposited ; a Leopard (*Felis pardus* ♂) from Africa, a Small-eared Fox (*Canis microtis* ♂) from the Upper Amazons, a Marsh Ichneumon (*Herpestes paludosus*) from South Africa, two Water Chevrotains (*Hyemoschus aquaticus*), an Erxleben's Monkey (*Cercopithecus erxlebeni*) from West Africa, a Red-faced Saki (*Brachyrurus rubicundus* ♀) from the Upper Amazons, a Weeper Capuchin

(*Cebus fatuellus*) from Guiana, a Red-billed Toucan (*Ramphastos erythrorhynchus*) from Cayenne, purchased; a Smooth Snake (*Coronella laevis*), European, received in exchange.

#### OUR ASTRONOMICAL COLUMN

DEFINITIVE COMET-ORBITS.—I. The fourth comet of 1874 (Coggia, April 17). Dr. Hepperger, of Vienna, has investigated the orbit of this comet from the whole extent of observation, founding his work upon 17 normals from 638 observed positions. He finds the orbit an ellipse with period of 13,708 years, and considers that his results exclude equally a parabola and any ellipse with a revolution shorter than 8000 years. The aphelion distance is 1144.9 (the earth's mean distance from the sun being taken as unity), at the descending node the radius-vector is 0.717, near the orbit of Venus, and at ascending node it is 11.734. Coggia's comet became visible to the naked eye at the beginning of June, and so continued until it was lost in these latitudes in the middle of July, when the tail had gradually increased to 23°.

2. Definitive elements have also been determined for the second comet of 1847, by M. Folke Engstrom of Lund. The comet was discovered by Colla at Parma, on May 7, and was last observed by the late Mr. Lassell at Starfield, Liverpool, on December 30, or over a period of nearly eight months. The orbit is chiefly remarkable for the large perihelion distance, 2.115, which has been exceeded in very few cases. The resulting elements are hyperbolic  $e = 1.0006549$ . So far as we know this is the only instance where the latest observations for position have been obtained with a reflector, the statement that has been more than once made that Halley's comet in 1836 was last observed by Sir John Herschel with his 20-feet reflector at Feldhausen, Cape Colony, being a mistake; the last observation was made by Lamont with the 11-inch refractor at Munich on May 17.

THE VARIABLE STAR ALGOL.—The following are the Greenwich times of minima of Algol, occurring before 15h., during the last quarter of the present year, taking Prof. Winnecke's ephemeris as authority:—

| h. m.         | h. m.        | h. m.          |
|---------------|--------------|----------------|
| Oct. 14, 13 0 | Nov. 9, 8 20 | Dec. 16, 14 55 |
| 17, 9 49      | 26, 13 13    | 19, 11 44      |
| 20, 6 38      | 29, 10 2     | 22, 8 33       |
| Nov. 3, 14 42 | Dec. 2, 6 51 | 25, 5 22       |
| 6, 11 31      |              |                |

THE MOTION OF 61 CYGNI.—The following formulae appear to represent the observations of this remarkable system up to the present epoch within about their probable errors; P is the angle of position, D the distance:—

$$D \sin P = + 16''4657 + [8.63013] (t - 1850^{\circ})$$

$$D \cos P = - 3.6892 - [9.27178] (t - 1850^{\circ}).$$

Hence we find—

Diff. R.A.      Diff. Decl.

|         |              |           |                                     |
|---------|--------------|-----------|-------------------------------------|
| 1753.8  | ... + 1°2    | ... - 1°7 | Bradley.                            |
| 1778    | ... + 1°9    | ... - 0°2 | Ch. Mayer.                          |
|         | Δ P (c - o). | Δ D.      |                                     |
| 1781.85 | + 2°4        | - 0°04    | Herschel I.                         |
| 1812.30 | - 1°7        | - 0°69    | Bessel.                             |
| 1822.26 | - 0°1        | + 0°14    | Struve and Herschel II.             |
| 1830.84 | 0°0          | + 0°01    | Bessel.                             |
| 1842.70 | - 0°3        | - 0°29    | Dawes and Struve.                   |
| 1856.37 | - 0°1        | - 0°29    | Demb., Jacob, Secchi,<br>1854-1857. |
| 1867.15 | 0°0          | - 0°16    | Knott, Demb., Duner,<br>1866-67.    |
| 1877.47 | 0°0          | 0°00      | Hall, Demb., Duner,<br>1875-79.     |
| 1881.45 | 0°0          | - 0°01    | Jedrzejewicz.                       |

And for comparison with measures about this epoch:—

| P.     | D.                            |
|--------|-------------------------------|
| 1882.5 | ... ... 118°50 ... ... 20°469 |
| 1883.5 | ... ... 119°08 ... ... 20°476 |

THE COMET OF 1763.—The comet observed by Dunlop at Paramatta in 1833 has been referred to as affording an instance

of near approach to the earth's orbit at both nodes; according to Dr. Hartwig's elements the distance at ascending node is 0.092, and at descending node 0.186. But a much more noticeable case is offered by the comet of 1763. In Burckhardt's ellipse we find the distance at ascending node 0.0315, and at descending node 0.0252, the time occupied in passing from node to node is 772 days.

#### THE EXCITABILITY OF PLANTS<sup>1</sup>

##### II.

THE complete knowledge we have gained from our study of the anther filaments of *Centaurea* of the mechanism of the excitable plant cell, can be applied to every other known example of irrito-contractility in the organs of plants, and particularly to that most remarkable of all such structures, the leaf of *Dionaea muscipula*. Although I described the structure of the leaf just eight years ago in this room, I will occupy a moment in repeating the description. The blade of the leaf is united on to the stalk by a little cylindrical joint. Here are two models, in one of which the leaf is represented in its closed state, in the other in which it is in its unexcited or open state. The leaf is everywhere contractile—that is, excitable by transmission, but not everywhere susceptible of direct excitation—or, in common language, sensitive. It is provided with special organs, of which we do not find the counterpart in any of the plants to which reference has been made, for the reception of external impressions—organs which, from their structure and position, can have no other function.

The action of the leaf, to which the plant owes its name, and by which it seizes its prey, is, in its general character, too well

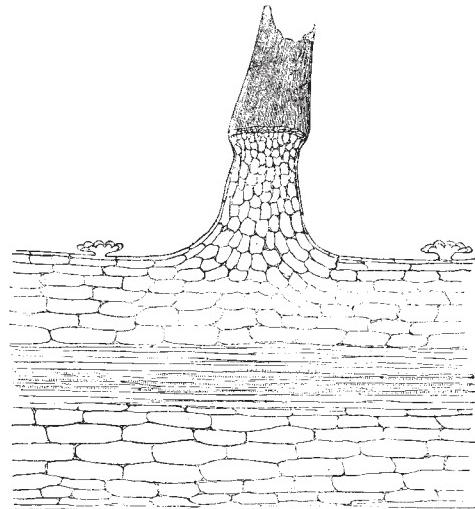


FIG. 6.—Transverse section of lobe of leaf of *Dionaea* comprising the root of a sensitive hair.

known to require description. In the shortest possible terms, it is the sudden change of the outer surface of each lobe of the leaf from convex to concave, and at the same time the crossing of the two series of marginal hairs, as the fingers cross when the hands are clasped. What I desire to show with respect to it is, that here also the agents are individual cells—that is, that the individual elements out of which the whole structure is built are the immediate agents in the production of the movement.

A cross-section of the leaf shows the following facts: If the section be made in the direction of the parallel fibro-vascular bundles which run out from the mid-rib nearly at right angles, and happen to include one of these bundles, it is seen that it consists of three parts, viz. the fibro-vascular bundle in the middle and equidistant from both borders; of the cylindrical cells of the parenchyma on either side, and of an external and internal epidermis. The external epidermis is smooth and glistening, and its cells possess thicker walls than those on the opposite surface.

<sup>1</sup> Lecture delivered at the Royal Institution June 9, 1882, by Prof. Burd n Sanderson, F.R.S. Continued from p. 356.